

## The Basic Working Principle of a Dresser Coupling

The cutaway view at right shows the basic components of a Dresser coupling consisting of one cylindrical middle ring, two follower rings, two resilient gaskets of special Dresser compound and a set of steel trackhead bolts. The middle ring has a conical flare at each end to receive the wedge portion of the gaskets. The follower rings confine the outer ends of the gaskets.

Tightening the bolts draws the follower rings toward each other, compressing the gaskets in the spaces formed by follower rings, middle ring flares and pipe surface. This produces a flexible, 360-degree leak-proof seal.

Standard Dresser Style 38 and Style 40 couplings are seal-only products. However, Dresser offers a line of seal & restraining couplings and fittings as well. Selection of proper coupling and gasket grade depends on service conditions, line pressure, line content and temperature.

### Piping Materials for Dresser Couplings

Dresser couplings are suitable for joining steel pipe, cast and ductile iron pipe, and polyethylene pipe\* (PE). As a general recommendation, any metallic piping material with a dimension ratio (OD/Wall) of 200 or less is suitable for Dresser couplings.

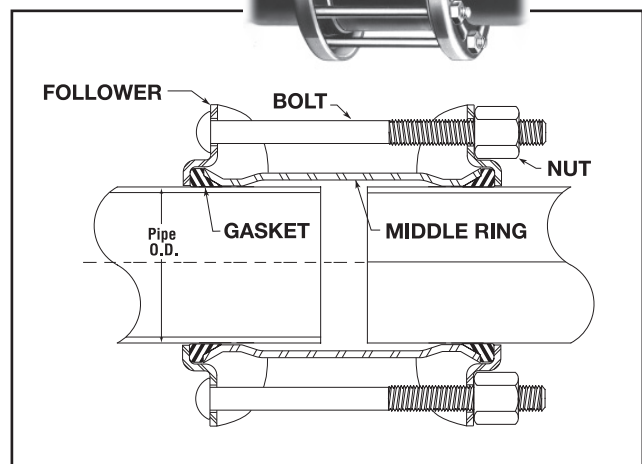
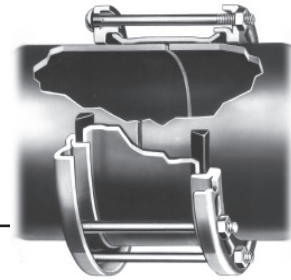
Given the relatively high unit loading of Dresser gaskets coupled with our bolt torque recommendations, lab testing on other pipe materials - such as SCH 10 Steel, PVC and Fiberglass (FRP/GRP) - the potential for brittle failure (cracking) has been noted. For that reason Dresser does not endorse the use of our bolted coupling products for these pipe material applications. (See particular pipe manufacturer for usage regulations)

\*Polyethylene Pipe as listed in ASTM-D2513

### Coupling & Fitting Components

The following is a general listing and function of Dresser product components:

- **Anode Connector** - An optional connection provided for attachments of an anode to the coupling, normally on the body or middle ring, for cathodic protection.
- **Armor** - A metallic coil embeded in the gasket tip providing conductivity between the middle ring and follower as well as protection from attack by severe line content.
- **Bolt and Nut** - Provides means of compressing the followers of a bolted coupling, providing a seal only or a seal & restraining joint, depending on coupling design.
- **Compression Nut** - The component that compresses the retainer cup, gasket and/or grip ring by tightening onto the body of threaded compression couplings and fittings.



- **Follower** - Fabricated ring that retains the gasket and provides a means to compress the gasket and grip ring in bolted products.
- **Follower Insulator** - A high-dielectric annular sleeve formed to prevent conductivity between the pipe and coupling on the insulating pipe end.
- **Gasket** - Compounded rubber sealing component which is compressed upon installation, providing a pressure seal. Can be standard, armored, insulating or conductive.
- **Grip Ring** - Holds the pipe against pullout in couplings and fittings made for seal and restraining joints.
- **Insert Stiffener** - A tubular reinforcement sleeve used on all polyethylene pipe ends to prevent pipe collapse.
- **Insulator** - A high-dielectric cylindrical sleeve preventing electrical shorting between the pipe and middle ring.
- **Middle Ring or Body Sleeve** - Pressure containing component that bridges the gap between pipe ends.
- **Pipe End Separator** - A high-dielectric plastic ring which prevents electrical shorting from pipe end to pipe end.
- **Retainer Cup** - Component that retains and helps compress the gasket in a threaded, boltless compression fitting.

Tough, corrosion-resistant Dresser factory-applied coatings offer unprecedented protection on steel, cast-iron and other metal product components. Applied under rigidly controlled manufacturing and quality conditions, the thermally-cured Dresser coatings are highly resistant to aggressive atmospheric conditions and abrasion offering a combination of strength and durability for the life of the product.

## ALCLAD™ Epoxy Coating

Dresser Epoxy is a grey, thermoset, fusion-bonded coating and has outstanding physical properties and can be utilized in many piping system applications due to such features as:

- High coating dielectric strength.
- Excellent disbondment resistance in cathodically protected systems.
- Resistant to soil stress and fungi.
- Excellent adhesion in an oven-cured factory application.

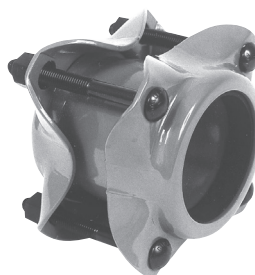
All constituents of the epoxy cured film are FDA approved for exposure to fluids for human consumption. ALCLAD also provides an excellent coating for use on components of cathodic protected distribution systems. Thermoset epoxy coatings meet DOT and Federal regulation 192.461. Please consult the factory for special line contents and applications.

## Dresser RED-D Shopcoat

Dresser Shopcoat paint is a waterborne finish, pigmented with red oxide. RED-D provides a suitable base over which primers and final coatings can be applied.

Dresser shopcoat provides a smooth, clean, non-greasy, non-sticky surface and protects all products from corrosion in normal storage situations. It is compatible with primer and enamel coatings of either hard or soft grades of plasticized or unplasticized coal tar enamels, and with asphalt coatings.

For above ground, Dresser Shopcoat will take most of the usual types of paint, including paints with color added, without bleeding through.



Dresser Style 38 bolted coupling with thermoset grey epoxy coating

## ALCLAD™ E-Coat

Dresser E-Coat paint is a thin-film, thermoset epoxy material pigmented to a rich black color. E-Coat is a non-toxic coating and bonds to a clean metal surface providing high-impact resistance and protection from abrasion and corrosion.

## ALCLAD™ Plastisol

Dresser Plastisol is a one-part, heat curable, thermoplastic polyvinyl chloride material offering optimum corrosion resistance. Applied in a thickness of 50 mils, Plastisol is an exceptionally tough, durable material with excellent impact and cut-through protection.

## Field Coatings

Optional customer-supplied field coating of Dresser coupled joints in underground service is acceptable and usually done with the same type of coating used on the carrier pipe itself. Application guidelines, instructions and recommendations of the firm supplying the coating should be followed.

Contact Dresser engineering department with any questions or assistance with your coating solution requirements.



## How to Specify Ends\* on Steel Pipe

On orders and in specifications, the ends on steel pipe to be used with Dresser couplings may be specified briefly as follows:

- The pipe shall be furnished with plain ends for Dresser couplings in accordance with AWWA (American Water Works Association) Steel Water Pipe Specifications;

OR:

- The pipe shall be furnished with plain ends for Dresser couplings in accordance with API (American Petroleum Institute) Line Pipe Specifications.

If specifications are to be detailed, the following may be used:

For Pipe Above 5" OD to 10-3/4" OD inclusive:

- The pipe shall be sufficiently free from indentations, projections or roll marks for a distance of 8" from the end of the pipe to make a tight joint with the rubber-gasket type of coupling. The outside diameter of the pipe shall not be more than 1/64" smaller than the nominal outside diameter for a distance of 8" from the end of the pipe and shall permit the passing for a distance of 8" of a ring gauge which has a bore 1/16" larger than the nominal outside diameter of the pipe. The minimum outside pipe diameter shall be determined by the use of a steel tape applied circumferentially to prevent the shipment of undersized, out-of-round pipe which, if measured diametrically through the maximum diameter or checked with a No-Go ring gauge, might appear within the specified tolerance.

For Pipe Larger than 10-3/4" OD:

- The pipe shall be sufficiently free from indentations, projections or roll marks for a distance of 8" from the end of the pipe to make a tight joint with the rubber-gasket type of coupling. The outside diameter of the pipe shall not be more than 1/32" smaller than the nominal outside diameter for a distance of 8" from the end of the pipe and shall permit the passing for a distance of 8" of a ring gauge which has a bore 3/32" larger than the nominal outside diameter of the pipe. The minimum outside pipe diameter shall be determined by the use of a steel tape circumferentially applied to prevent the shipment of undersized, out-of-round pipe which, if measured diametrically through the maximum diameter or checked with a No-Go ring gauge, might appear within the specified tolerance.

\*While Dresser couplings require only plain-end pipe, other kinds of pipe ends (such as threaded, beveled or grooved) can be used if such pipe is already on hand.

## How to Specify Ends on Cast/Ductile Iron Pipe

On orders and in specifications, the ends on cast or ductile iron pipe to be used with Dresser couplings may be specified briefly as follows:

- The pipe shall be furnished with plain ends for Dresser couplings in accordance with AWWA (American Water Works Association) specifications on tolerances;

OR:

- The pipe shall be furnished with plain ends for Dresser couplings in accordance with AGA (American Gas Association) specifications on tolerances.

If further specifications are desired, the following may be added:

- The pipe shall be smooth and round for a distance of 8" from each end. The maximum plus or minus variation from nominal outside diameters for each size shall not exceed dimensions as shown in chart shown below.

- The maximum outside pipe diameter shall be such as to permit the passing of a ring gauge having an internal bore not greater than .01" larger than the maximum allowable outside diameter of the pipe. This ring gauge shall go over the end of the pipe for a distance of 8" for all sizes up to and including 24" and for a distance of 12" on sizes above 24".

- The minimum outside diameter shall be determined by use of a steel tape circumferentially applied to prevent the shipment of undersized, out-of-round pipe which, if measured diametrically through the maximum diameter or checked with a No-Go ring gauge, might appear within the specified tolerance.

OD Size	Maximum Variation
3" - 16"	.06"
18" - 24"	.08"
30" - 42"	.10"
48"	.12"
54" - 60"	.15"

# How to Specify Dresser Products

For those who may wish to draw up specifications of a general nature covering Dresser Style 38 couplings, this suggested form is offered:

1.) The pipe coupling shall be of a gasketed, sleeve-type design with diameter to properly fit the pipe. Each coupling shall consist of one (1) steel middle ring, of thickness and length specified, two (2) steel followers, two (2) rubber-compounded wedge section gaskets and sufficient track-head steel bolts to properly compress the gaskets.

The middle ring and followers of the coupling shall be true circular sections free from irregularities, flat spots or surface defects. They shall be formed from mill sections with the follower-ring section of such design as to provide confinement of the gasket. After welding, they shall be tested by cold expanding a minimum of 1% beyond the yield point. The middle ring, inside and out, and followers shall be coated with ALCLAD™ thermo-setting, fusion-bonded epoxy coating material that provides disbondment resistance in cathodically-protected systems and resistance to soil stresses and fungi.

All constituents of the cured film are FDA and NSF-61 approved for exposure to fluids for human consumption and potable water.

The coupling bolts shall be of the elliptic-neck, track-head design with rolled threads. The manufacturer shall supply information as to the recommended torque to which the bolts shall be tightened. All bolt holes in the followers shall be oval for greater strength.

The coupling gaskets shall be composed of a crude or synthetic rubber base compounded with other products to produce a material that will not deteriorate from age, heat, or exposure to air under normal storage conditions. It shall also possess the quality of resilience and ability to resist cold flow of the material so that the joint will remain sealed and tight indefinitely when subjected to shock, vibration, pulsation and temperature or other adjustments of the pipeline.

2.) The couplings shall be assembled on the job in a manner to ensure permanently tight joints under all reasonable conditions of expansion, contraction, shifting and settlement, unavoidable variations in trench gradient, etc. The coupling shall be Dresser Style 38, as manufactured by Dresser Pipeline Solutions, Bradford, PA, and the necessary quantity shall be furnished.

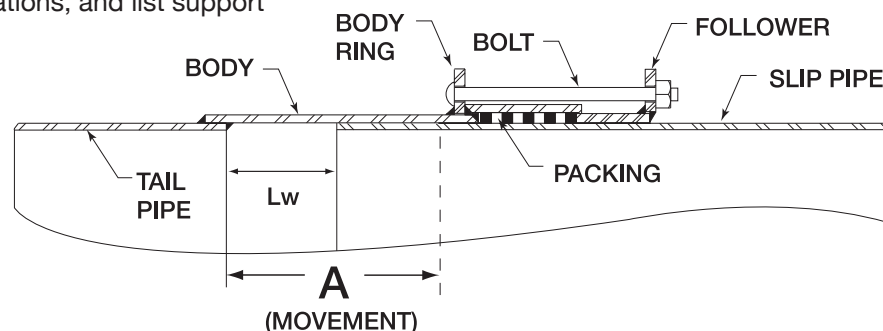
## When Ordering Dresser Style 63 Expansion Joints

Inquiries or orders for Dresser Style 63 Expansion Joints should contain the following information:

- (1) Quantity
- (2) Type of pipe: Steel, Cast/Ductile Iron, etc.
- (3) Style Number and Type 1 or Type 2
- (4) Service: Water, Industrial, other
- (5) Maximum working line pressure
- (6) Amount of movement to be taken care of by each joint
- (7) Temperature limitations and ranges
- (8) Frequency of cycling;
- (9) End preparation of body, slip or tail pipe:  
Beveled for welding, Flanged, other
- (10) Remarks, unusual installations, and list support methods of line and joint

Standard gaskets are Buna-S Grade 27. The proper type of expansion joint to use and the method of anchoring and connecting it into a line depend upon the conditions of service and type of installation, as well as other joints in the line.

The most effective use of Style 63 expansion joints usually requires an engineering recommendation. For that reason, a complete description of the installation should be submitted, with project sketches, CAD files or working drawings, if possible. Special joints may also be made for unusual conditions.



## Angular deflection, parallel offset, movement, expansion and contraction

When Dresser couplings are being used to provide lateral displacement - or parallel offset, couplings should be used in pairs. A single coupling will not accommodate lateral displacement because the coupling is placed in shear position.

The lateral displacement capability of couplings can be used to good advantage to protect pipelines where:

### (A) Branch Connections

A lateral connection (tee) is made to a long pipe subject to thermal expansion/contraction. Two couplings used on the branch connection will relieve the bending stresses.

For pipelines entering a building bulkhead, foundation or other structure: Two couplings and a spool piece will accommodate the differential settlement between the pipeline and building.

### (B) Tank Connections

Two Dresser couplings and a spool piece will accommodate the differential settlement between the pipeline and the tank.

### (C) Risers

Two couplings and a spool piece will take care of movement in any direction.

## Expansion & Contraction

Most pipelines are subject to various external forces and require flexibility to protect the pipeline itself. Dresser couplings create a flexible, non-rigid pipe joint that 'floats' on the pipeline and is capable of absorbing ordinary expansion, contraction, vibration, longitudinal stress, and deflection movements of the carrier pipe.

Dresser coupled joints 10.75 OD and larger will safely accommodate up to 3/8" longitudinal pipe movement without breaking the gasket seal. This is equivalent to the amount of movement resulting from a 120° temperature variation in a 40-foot length of steel pipe. Allowable axial movement for smaller pipe sizes 3/4" thru 2" ID is 1/8", and 1/4" for sizes 2-1/2" up to 10" OD.

If pipe is not buried, anchorage should be provided to prevent excessive accumulation of movement. For repeated movements such as on a bridge or above ground, or if expansion exceeds 3/8" per joint, engineers should spec a Dresser Style 63 expansion joint which permits up to 10" of concentrated pipe movement.

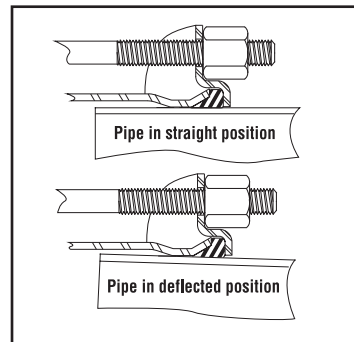


Dresser Style 63  
Type 1 Expansion Joint

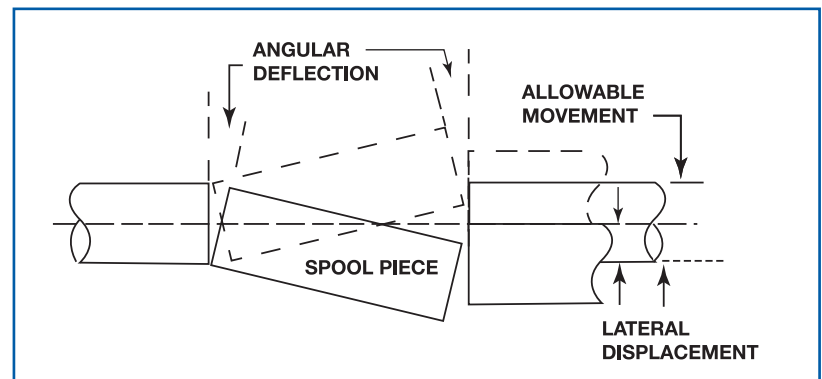
## Laying out curves with standard Dresser couplings and straight sections of pipe

Presented in tabular form in the table below entitled "Radius of Curve and Deflection of Pipe in Feet", this chart indicates (1) radius of circle for any given degrees of deflection and pipe length, 2) length of pipe for any given radius and deflection or (3) degrees deflection necessary for any given pipe length and radius. This information is worked out for the more commonly used pipe lengths and degrees of deflection.

Length of Pipe Sec. (Ft.)	Radius of Curve (Feet)						Deflection of Pipe (Feet/Inches)					
	Degrees deflection in each coupling						Varying degrees deflection in each coupling					
	1°	2°	3°	4°	5°	6°	1°	2°	3°	4°	5°	6°
6'	344	172	115	84	66	57	1/4"	2-1/2"	3-3/4"	5"	6-1/4"	7-1/2"
12'	687	344	229	172	138	114	2-1/2	5	7-1/2	10	1' 5/8	1' 3
16'	916	458	306	229	183	153	3-3/8	6-3/4	10	1' 1-1/2	1' 4-3/4	1' 8
18'	1031	516	344	258	206	172	3-3/8	7-1/2	1' 1-1/4	1' 3-1/8	1' 6-7/8	1' 10-1/2
20'	1145	573	382	286	229	191	4-1/4	8-3/8	1' 5/8	1' 4-3/4	1' 8-7/8	2' 1
30'	1718	860	573	430	344	286	6-1/4	1' 5/8	1' 6-7/8	2' 1	2' 7-7/8	3' 1-5/8
40'	2291	1146	764	573	458	382	8-3/8	1' 4-3/4	2' 1	2' 9-1/2	3' 5-7/8	4' 2-1/8



Maximum Recommended Laying Deflection Dresser Style 38 Couplings			
From 3/8" ID to 2" ID Inclusive.....6°			
From 2" ID to 14" OD Inclusive .....4°			
With Middle Ring Lengths:	5"	7"	10"
14" OD - 20" OD Inclusive	2-1/2°	4°	4°
20" OD - 30" OD Inclusive	2°	4°	4°
30" OD - 37" OD Inclusive	1-1/2°	3°	3-1/2°
37" OD - 42" OD Inclusive		2-1/2°	3-1/2°
42" OD - 49" OD Inclusive		2°	3°
49" OD - 54" OD Inclusive		2°	3°
54" OD - 66" OD Inclusive		2°	2-1/2°
66" OD - 78" OD Inclusive			2°
78" OD - 90" OD Inclusive			1-1/2°



Lateral displacement is accomplished by angular deflection of a spool piece (section of pipe) between two couplings. The length of the spool piece will determine the amount of allowable lateral displacement for a given angular deflection. The two couplings with a length of pipe between act as universal joints and will allow for lateral movement in any direction. NOTE: Parallel offset cannot be accommodated for single coupled joints!

The spool piece length is calculated as follows:

$$X = \frac{Y}{\text{Sine of Allowable Coupling Angle of Deflection}}$$

X = Length of Spool Piece  
Y = Lateral Displacement



## Pipe End Spacing

Pipe end spacing, or pipe gap, inside the middle ring sleeve is based on the allowable deflection of the middle ring when centered on the pipe joint.

(See chart at right).

As a general recommendation, and for straight runs of pipe, stab depth should be adequate to prevent pipe pullout. To allow for pipe expansion and contraction, the minimum gap is 1/2". In no circumstance should pipe ends be butted inside the middle ring body sleeve.

## Longitudinal Movement

Dresser couplings for steel pipe 10.75" and larger will safely accommodate up to 3/8" longitudinal pipe movement. Allowable axial movement for smaller pipe sizes 3/4" thru 2" ID is 1/8", and 1/4" for sizes 2-1/2" up to 10" OD.

For Dresser boltless compression fittings such as the Style 65's will allow 1/16"; whereas Style 90 couplings permit up to 1/8" longitudinal movement.

## Torque Recommendations

Bolt torque recommendations are listed on all Dresser Installation Instructions as supplied with each product. The use of torque wrenches facilitate uniform tightening of all bolts to proper torque ensuring the coupled joint seals as required. Torque specifications for couplings are as follows:

- 3/8" and 1/2" Bolts - 35 ft. lbs.
- 5/8" Bolts - 75 ft. lbs.
- 3/4" Bolts - 90 ft. lbs.

## Methods of Supporting Coupled Lines

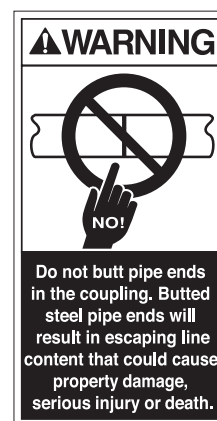
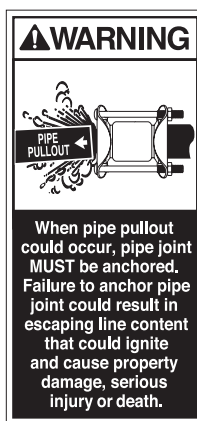
Shown below are three options for supporting pipeline connections when using Dresser couplings. **Figure A** shows the offset method near the pipe joint for diameters 6" and smaller with pipe lengths up to 20 feet. Suitable for any pressure providing pipe is anchored to support for high pressure. **Figure B** indicates the center-type support for diameters from 6" to 16" and lengths not over 20 feet.

## Pipe End Spacing

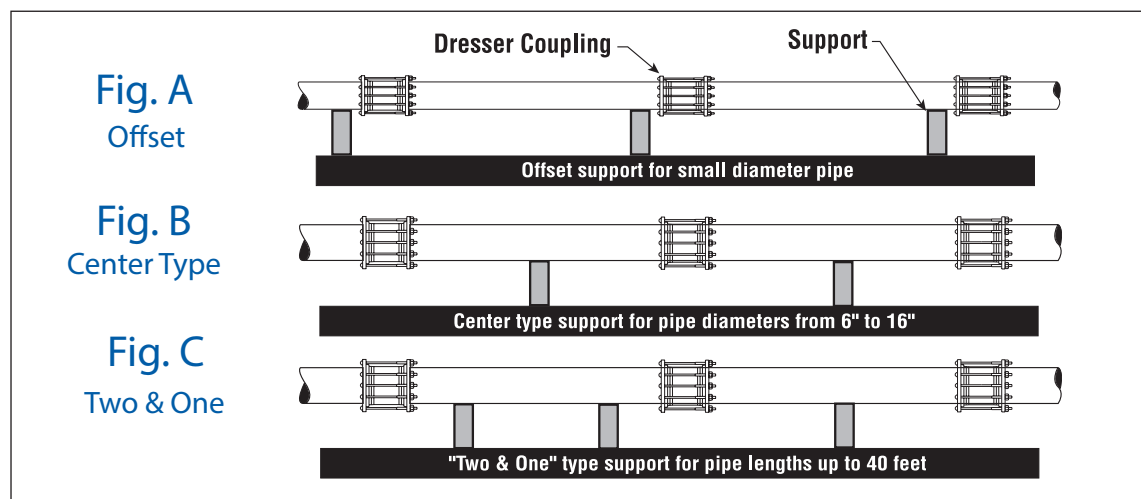
### Standard Style 38 Couplings

MIDDLE RING LENGTH	MIN PIPE END STAB	MAX PIPE GAP (For Max Deflection)	PIPE GAP (Zero Deflection)
5"	1"	1-1/2"	3"
7"	1-1/4"	2"	4-1/2"
12"	2-1/4"	4"	6-1/2"
16"	2-1/4"	8"	11-1/2"
24"	2-1/4"	16"	19-1/2"

NOTE: These values for the maximum pipe end spacing - or pipe gap - is based on MAX DEFLECTION of the pipe at the time of installation, or No Deflection. Middle ring shall always be centered on pipe.



This method is suitable for pressures up to 25 lb. maximum with pipe fully anchored to supports. **Figure C** shows the "Two & One" method for all sizes and any length of pipe up to 40 feet. Suitable for any pressure providing pipe is adequately anchored. When utilizing this method each length of pipe must be anchored to one (and ONLY one) support.



## Dresser Compounded Rubber Gaskets

Pipe joints must be able to absorb pipe stress caused by natural forces and allow for expansion, contraction, vibration and deflection while the line is in service.

The sealing capabilities and extreme flexibility of a Dresser coupled joint is made possible by the resilience of the rubber-compounded gaskets. Resiliency is the property that enables the gaskets to maintain pressure against the followers that confine it and, at the same time, allow for flexibility not found in rigid piping connections. Without it, a flexible joint is not possible! Simply put, the absorption of pipeline stress permits each section of the pipeline to “float” in the joint ensuring a flexible piping system. The information below is provided as a general review of various gaskets available when installing Dresser products.

## Armored® Gaskets

Armored gaskets can be used to great advantage where low electrical-resistant joints are desired. The armor “bites” into the pipe providing metal to metal contact allowing easy passage of current where cathodic protection is a necessity.

The armor—an elastic, practically indestructible brass coil or helix—is molded into the gasket tip becoming an integral part of the gasket. When used with the proper grade/compound rubber, the armor shields the gasket material from the line content without interfering with the sealing efficiency of the gasket.

## BUNA-S Grade 27 (Styrene) Max. Temp. 212°F<sup>1</sup>

The compound most generally used for plain gaskets is BUNA-S. This gasket has wide applications and is accepted as standard for most pipeline use. It is recommended for use on lines transporting both fresh water and salt water, natural and other gases, air, most acids, alkaline and sugar solutions and some refrigerants.

## BUNA-N Grade 42 (Nitrile) Max. Temp. 212°F<sup>1</sup>

BUNA-N gaskets are resistant to oil, most aromatic and aliphatic hydrocarbons, natural gas fogging oil, condensates and gasoline.

## Butyl - Max. Temp. 250°F; PSI to middle ring yield strength.

Butyl gaskets are resistant to hot air service, steam, hot water and miscellaneous aqueous solutions. They are also suitable for vegetable oils, organic chemicals, oxidizing acids and alkalies.

## EPDM - Max. Temp. 300°F; MAX PSI: 250

EPDM gaskets provide excellent resistant to aging factors such as ozone, oxygen and elevated temperatures. This includes service in hot water, steam and dry heat. They are also suitable for handling popular chemicals such as ketones, alcohols, phosphate ester hydraulic fluids, glycols, vegetable oils, inorganic salt solutions, diluted acids and alkalies.

## VITON (Fluorocarbon) Max. Temp. 350°F; MAX PSI: 100

Fluorocarbon gaskets are resistant to hydrocarbons, aromatic hydrocarbons, alcohols, organic acids, nitrogen-containing compounds, vegetable oils and greases.

## High Temperature - Max. Temp. 1200°F; NO PSI RATING

These braided, flexible gaskets are designed specifically for high temperature and abrasive atmospheres associated with services such as fly ash handling systems. As a replacement for asbestos, these gaskets are manufactured of a pure homogenous graphite bonded to a fiberglass carrier for strength and thermal durability. The braid over braid construction is die-formed and cut to length to fit proper coupling configurations resulting in a uniform tolerance which has proven itself as a reliable asbestos replacement.

Note: The non-resilient characteristic of this particular gasket material may result in a non leak-proof seal. This should be taken into consideration for this application.

<sup>1</sup>NOTE: For Dresser Styles 65, 88 and 90 compression fittings, the maximum Temperature is 150°F

GASKET GRADE	TYPE RUBBER	MAXIMUM TEMP	MAXIMUM PSI*	MOLD PAINT CODE	SHORE A DUROMETER
27 (Spec 35)	SBR - BUNA S	212°F <sup>1</sup>	Per Prod. Spec	White	75 ± 5
29 - Spec 328	SBR - BUNA S	212°F	Per Prod. Spec	Light Green	70 ± 3
41	Natural	212°F	Per Prod. Spec	Dark Green	75 ± 5
42	BUNA N Nitrile	212°F <sup>1</sup>	Per Prod. Spec	Yellow	75 ± 5
169	Butyl	250°F	Per Prod. Spec	Blue	75 ± 5
199	EPDM	300°F	250 PSI	Light Gray	75 ± 5
224	VITON** (Fluorocarbon)	350°F	100 PSI	Brown/Tan	75 ± 5

**WARNING:** Temperature recommendations are for reference purposes only. Please consult Dresser Inside Sales for specific recommendations, product style, line content, working pressure and temperature ranges.

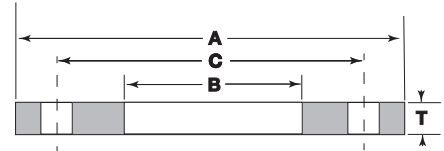
\*Reference Product Catalog by Style Number

\*\*VITON is a registered trademark of Dupont.

AWWA C207 Class-D 150# is the standard flange used on Style 128 Flange Adapters, Style 63 Expansion Joints and Style 131 Dismantling Joints

## AWWA Standard Steel Ring C-207 CLASS-D Flange Specifications 6" thru 48"

\*NOTE: These flanges have the same OD and Drilling as the ANSI/ASME B16.5 Class 125 Cast-Iron Flanges



Nominal Pipe Size	Flange OD (A)	Thickness Slip-On (T)	Thickness Blind (T)	Bore (B)	Drilling Bolt Circle (C)	Drilling Hole Diam (in)	Number Bolt Holes	Weight Slip-On (lbs)	Weight Blind (lbs)
4	9.00	0.625	0.625	4.57	7.50	0.750	8	8	11
6	11.00	0.688	0.693	6.72	9.50	0.875	8	11	19
8	13.50	0.688	0.812	8.72	11.75	0.875	8	15	33
10	16.00	0.688	0.953	10.88	14.25	1.000	12	19	54
12	19.00	0.812	1.117	12.88	17.00	1.000	12	33	90
14	21.00	0.938	1.133	14.19	18.75	1.125	12	47	111
16	23.50	1.000	1.265	16.19	21.25	1.125	16	60	155
18	25.00	1.062	1.331	18.19	22.75	1.250	16	64	185
20	27.50	1.125	1.448	20.19	25.00	1.250	20	79	244
24	32.00	1.250	1.661	24.19	29.50	1.375	20	112	378
26	34.25	1.312	1.786	26.19	31.75	1.375	24	129	466
28	36.50	1.312	1.906	28.19	34.00	1.375	28	141	565
30	38.75	1.375	2.008	30.19	36.00	1.375	28	164	671
32	41.75	1.500	2.150	32.19	38.50	1.625	28	211	834
34	43.75	1.500	2.252	34.19	40.50	1.625	32	220	959
36	46.00	1.625	2.370	36.19	42.75	1.625	32	261	1116
38	48.75	1.625	2.506	38.19	45.25	1.625	32	301	1325
40	50.75	1.625	2.609	40.19	47.25	1.625	36	313	1438
42	53.00	1.750	2.729	42.19	49.50	1.625	36	364	1706
44	55.25	1.750	2.849	44.19	51.75	1.625	40	387	1935
46	57.25	1.750	2.952	46.19	53.75	1.625	40	404	2153
48	59.50	1.875	3.072	48.19	56.00	1.625	44	460	2420

FLANGE CLASS	SIZE RANGE	MAXIMUM PRESSURE	DRILLING	FLANGE FACING
AWWA C-207 CLASS B	4" THRU 144"	80 PSI	125/150#	FF ONLY
AWWA C-207 CLASS D	4" THRU 144"	*150 PSI	125/150#	FF ONLY
AWWA C-207 CLASS E	4" THRU 144"	250 PSI	125/150#	FF ONLY
AWWA C-207 CLASS F	4" THRU 18"	300 PSI	250/300#	FF ONLY
ANSI B16.5 CLASS 150	1/2" THRU 24"	280 PSI	125/150#	FF OR RF
ANSI B16.5 CLASS 300	1/2" THRU 24"	780 PSI	250/300#	FF OR RF
ANSI B16.47 CLASS 150	26" THRU 60"	280 PSI	125/150#	FF OR RF
ANSI B16.47 CLASS 300	26" THRU 60"	780 PSI	250/300#	FF OR RF

\*NOTE: 175 PSI for 4" thru 12" Sizes. Class-D 24" and smaller match ANSI/ASME B16.5 150 PSI standard for steel flanges



# Pipe Diameter OD Chart

## Standard Pipe Material Diameters For Sizes 1/2" thru 24"

Nominal Pipe Size (in)	Copper Tubing (in)	Steel Schedule 40 & PE (IPS)	Cast/Ductile Class A (in)	Cast/Ductile Class B (in)	Cast/Ductile Class C&D (in)
1/2"	.625	.84	-	-	-
3/4"	.875	1.05	-	-	-
1"	1.13	1.32	-	-	-
1-1/4"	1.38	1.66	-	-	-
1-1/2"	1.63	1.90	-	-	-
2"	2.13	2.38	2.50	-	-
2-1/2"	2.63	2.88	-	-	-
3"	3.13	3.50	3.80	3.96	3.96
4"	4.13	4.50	4.80	5.00	5.00
6"	6.13	6.63	6.90	7.10	7.10
8"	-	8.63	9.05	9.05	9.30
10"	-	10.75	11.10	11.10	11.40
12"	-	12.75	13.20	13.20	13.50
14"	-	14.00	15.30	15.30	15.65
16"	-	16.00	17.40	17.40	17.80
18"	-	18.00	19.50	19.50	19.92
20"	-	20.00	21.60	21.60	22.06
24"	-	24.00	25.80	25.80	26.32

\*CIP/DIP Sizes: 30"(32.00), 36"(38.30), 42"(44.50), 48"(50.80), 54"(57.56), 60"(61.61)

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